JAPANESE [JP,08-105901,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS EXAMPLE DESCRIPTION OF DRAWINGS DRAWINGS

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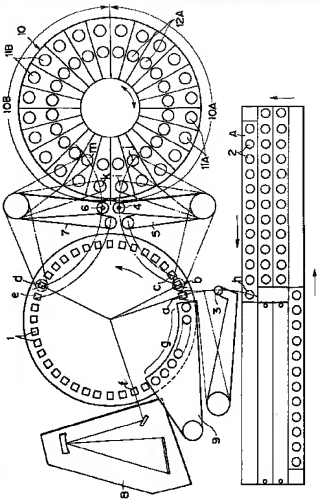
DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]This invention relates to the automatic analyzer which can be automatically performed to analysis of a maximum of 4 reagent systems as well as 1 reagent system analysis or 2 reagent system analysis.
[0002]
[Description of the Prior Art]Conventionally, it is almost the case which is constituted as an automatic analyzer which conducts biochemical analysis and immunological analysis so that analysis of one reagent system and analysis of two reagent systems may be conducted.
[0003]By the way, when HDL cholesterol (HDL-CHO) was measured, in the former, put the precipitation reagent which settles lipid other than this HDL cholesterol in the blood serum, centrifuged the quality of settlings, and were analyzing supernatant liquor, but. Although the reagent

Drawing selection Representative draw



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which can measure directly the HDL cholesterol in a blood serum is developed and development of the automatic analyzer which conducts HDL cholesterol analysis automatically using this reagent is demanded in recent years, It had the problem that it could not respond in the automatic analyzer which conducts analysis of one conventional reagent system, and analysis of two reagent systems since this HDL cholesterol measuring reagent is four reagent systems.

[0004]This invention is originated in view of this actual condition, and the place made into that purpose tends to provide the automatic analyzer which is constituted and becomes so that HDL cholesterol analysis which is four reagent systems can also be automatically conducted as well as analysis of one conventional reagent system, or analysis of two reagent systems. [0005]

[Means for Solving the Problem]To achieve the above objects, if it is in this invention, Have the 1st and 2nd reagent distributive-pouring pipette, and it is constituted, and an automatic analyzer which a reagent table comes to constitute so that a set of at least one or more-reagent vessel reagent vessel is possible is made into a technical premise, Make the above-mentioned reagent table correspond to a parameter, set four kinds of reagent vessels from the 1st reagent vessel of the maximum to the 4th reagent vessel, and the above 1st and the 2nd pipette device from these each reagent vessel, Drive controlling is carried out so that from the 1st reagent to the 4th reagent may be poured distributively to a reaction vessel one by one according to a time schedule.

[0006]In this invention, in analyzing four reagent systems, A reagent distributive-pouring pipette of the above 1st carries out requirements suction of the 1st reagent and the 2nd reagent from the 1st reagent vessel and the 2nd reagent vessel of a reagent table, pours them distributively in a reaction vessel, and the 2nd reagent distributive-pouring pipette, Drive controlling is carried out so that requirements suction of the 3rd reagent and the 4th reagent may be carried out from the 3rd reagent vessel and the 4th reagent vessel of a reagent table and it may pour distributively in a reaction vessel, Or when distributive-pouring time from the 1st reagent to the 4th reagent differs. After a reagent distributive-pouring pipette of the above 1st carrying out requirements suction of the 1st reagent from the 1st reagent vessel of a reagent table and pouring distributively in a reaction vessel, Carry out requirements suction of the 2nd

reagent with the 2nd reagent distributive-pouring pipette, and it pours distributively in a reaction vessel, Then, after carrying out requirements suction of the 3rd reagent from the 3rd reagent vessel with a reagent distributive-pouring pipette of the above 1st and pouring distributively in a reaction vessel, drive controlling is carried out so that requirements suction of the 4th reagent may be carried out from the 4th reagent vessel with the 2nd reagent distributive-pouring pipette and it may pour distributively in a reaction vessel.

[0007]Of course, if it is in this invention, measurement of a maximum of 48 items can be performed by allocating only a reagent vessel of one reagent system in a reagent table.

[0008]

[Example]Hereafter, based on one example shown in an accompanying drawing, this invention is explained in detail.

[0009]The automatic analyzer A concerning this example is constituted so that what is called four reagent systems that measure directly the HDL cholesterol in a blood serum, etc. may be analyzed.

A reaction vessel concrete supply system which transports the reaction vessel 1 to predetermined timing to the sample (blood serum) distributive-pouring position a, the 1st reagent distributive-pouring position b, the stirring position c, the 2nd reagent distributive-pouring position d, the stirring position e, the optical measurement position f, and the washing position g as shown in drawing 1, The sample vessel 2 in which requirements accommodation of the sample (blood serum) which should be measured was carried out, and an automatic-sampler device (not shown) which carries out the intermittent transfer of the sample cassettes A holding two or more these sample vessels 2 to the sample suction position h, The sampling pipette 3 which carries out requirements suction of the sample in this sample vessel 2, and is poured distributively to said reaction vessel 1, The 1st pipette 4 for reagents that pours distributively the 1st reagent and the 2nd reagent corresponding to a parameter in said reaction vessel 1, The agitating device 5 which agitates the sample by which this 1st reagent and 2nd reagent were poured distributively, The 2nd pipette 6 for reagents that pours distributively the 3rd reagent and the 4th reagent corresponding to a parameter in said reaction vessel 1, Transport the agitating device 7 which agitates the sample by which this 3rd reagent and 4th reagent were poured distributively, the optical measuring unit 8, the washing

station 9, and the reagent bottle 10A in which said 1st and 2nd reagents were accommodated to the 1st reagent suction position i or j, and. It is ** constituted with the reagent device 10 which transports the reagent bottle 10B in which said 3rd and 4th reagents were accommodated to the 2nd reagent suction position k or m.

[0010]the intermittent transport mechanism with this publicly known intermittent transport mechanism in which a reaction vessel concrete supply system carries out an intermittent transfer every 1 pitch to a necessary position one by one warming two or more reaction vessels 1 to abbreviated living body temperature -- the same -- each reaction vessel 1 -- an intermission -- or it is constituted so that step rotation may be carried out and it may transport one by one to the next treatment position.
[0011]As for the sample vessel 2, 12 pieces are held at linear shape at the sample cassettes A.
The intermittent transfer of each sample vessel 2 is carried out to the sample suction position h one by one via a publicly known intermittent concrete supply system.
The barcode label D is stuck on the surface of each sample cassettes A.
[0012]The arm with which the end was supported pivotally by the axis like the composition of a publicly known sampling pipette as for the above-mentioned sampling pipette 3, The pipette allocated by the other end of this arm, and the sampling pump (not shown) which free passage connection is made at this pipette, carries out requirements suction of the above-mentioned sample, and carries out the regurgitation to the reaction vessel 1, The above-mentioned arm consists of [**] the sample suction positions h with the sample distributive-pouring position a and the drive (not shown) which carries out rotation control to predetermined timing to a washing position (not shown) further, and carries out rise-and-fall control in each position.
[0013]The measuring method of this sample fills the inside of a sucking system with water, where a sample and water are isolated via air, after it carries out suction measuring, makes only a sample breathe out and washes the inside of a pipette through wash water from an inside after this. Of course, the pipette is set to the pipette washing position at the time of this washing.
The sample adhering to the outside surface of this pipette is washed in homotopic.

[0014]The reagent bottle 10A in which the 1st reagent with which the reagent corresponding to a parameter in the reagent device 10 was accommodated, and the 2nd reagent were accommodated, The reagent bottle 10B in which the 3rd reagent and the 4th reagent were accommodated, and the turntable (not shown) on which these each reagent bottles 10A and 10B were laid, A bottle concrete supply system (not shown) which carries out rotation control of this turntable, and transports the reagent corresponding to a parameter to the 1st reagent suction position i or the 2nd reagent suction position j and the 3rd reagent suction position k, or the 4th reagent suction position m, The 1st pipette 4 for reagents that carries out requirements suction of the 1st reagent and the 2nd reagent corresponding to a parameter in the above-mentioned 1st reagent suction position i or the 2nd reagent suction position j from the inside of the 1st reagent and the 2nd reagent bottle 10A, With the 2nd pipette 6 for reagents that carries out requirements suction of the 3rd reagent and the 4th reagent corresponding to a parameter, it comprises [**] inside of the 3rd reagent and the 4th reagent bottle 10B in the 3rd reagent suction position k or the 4th reagent suction position m.

[0015]It has the two suction openings 11A, 11B, 12A, and 12B, and the reagent bottles 10A and 10B allocated by the above-mentioned reagent table are constituted so that two kinds of different reagents may be accommodated and a storage reagent can be attracted with a pipette.

In this example, the 1st reagent and the 3rd reagent are accommodated in the periphery side, and the 2nd reagent and the 4th reagent are accommodated in the inner circumference side.

Of course, this order of accommodation is not limited to the above-mentioned example.

[0016]The above-mentioned reagent bottles 10A and 10B are set to the position defined beforehand, and the memory of the position of these each reagent bottles 10A and 10B is respectively carried out to control-section CPU. As for these reagent bottles 10A and 10B, 24 containers are constituted as one set, for example.

When parameters differ, it is constituted so that it can exchange by other sets and one-touch.

Each reagent in the reagent bottle 10A and 10B is cooled by Centigrade 10-12 **.

[0017]The 1st pipette 4 for reagents, and the 2nd pipette 6 for reagents, The arm with which the end was supported

pivotally by the axis like the composition of a publicly known pipette device although the graphic display was not carried out, It is ** constituted with the pipette allocated by the other end of this arm, the pump (not shown) which free passage connection is made at this pipette, attracts the reagent of requirements, and carries out the regurgitation to the reaction vessel 1, and each drive (not shown) which carries out rise-and-fall control of the above-mentioned arm.

[0018]After the 1st pipette 4 for reagents carries out requirements suction of the 1st reagent corresponding to a parameter from the suction opening 11A of the reagent bottle 10A in the 1st reagent suction position i, After pouring this distributively to the reaction vessel 1 in the reagent distributive-pouring position b, carrying out double action after this and completing washing work, After moving to the 2nd reagent suction position j and carrying out requirements suction of the 2nd reagent corresponding to a parameter from the suction opening 12A of the reagent bottle 10A, this is poured distributively to the reaction vessel 1 in the reagent distributive-pouring position b, and double action is carried out after this and it is washed. At this time, the reaction vessel 1 has stopped in the reagent distributive-pouring position b.

[0019]And the reaction vessel 1 which the distributive-pouring work of the 1st reagent of the above and the 2nd reagent ended is transported to the reagent distributive-pouring position d of the following, after being transported to the next stirring position c and completing the agitation operation by the agitating device 5 in this position.

[0020]After the 2nd pipette 6 for reagents carries out requirements suction of the 3rd reagent corresponding to a parameter from the suction opening 11B of the reagent bottle 10B in this reagent distributive-pouring position d in the 3rd reagent suction position k, After pouring this distributively to the reaction vessel 1 in the reagent distributive-pouring position d, carrying out double action after this and completing washing work, After moving to the 4th reagent suction position m and carrying out requirements suction of the 4th reagent corresponding to a parameter from the suction opening 12B of the reagent bottle 10B, this is poured distributively to the reaction vessel 1 in the reagent distributive-pouring position d, and double action is carried out after this and it is washed. At this time, the reaction vessel 1 has stopped in the reagent distributive-pouring position d.

[0021]And the reaction vessel 1 which the distributive-

pouring work of the 3rd reagent of the above and the 4th reagent ended is transported to the optical measurement position f of the following, after being transported to the next stirring position e and completing the agitation operation by the agitating device 7 in this position.
[0022]The measuring method of the reagent by each above-mentioned pipettes 4 and 6 for reagents fills the inside of a sucking system with water, where a reagent and water are isolated via air, after it carries out suction measuring, makes only a reagent breathe out and washes the inside of a pipette through wash water from an inside after this. Of course, the pipette is set to the pipette washing position at the time of this washing.
The sample adhering to the outside surface of this pipette is washed in homotopic.

[0023]The agitating devices 5 and 7 are transported with rotation of the arm of each pipettes 4 and 6 for reagents, they carry out gas blow mixing of the sample in the reaction vessel 1 immediately after pouring a reagent distributively, and are washed with each pipette after that in a pipette washing position.
[0024]The optical measuring unit 8 which forms a primary detecting element or a station is constituted by the diffraction grating method.
It is ** constituted with the control section (CPU) which carries out voltage conversion of the light volume received with a light source, two or more photo detectors arranged on the Rowland circle in the measuring beam irradiated from this light source, and the photo detector corresponding to a parameter, and processes that analytical value, and the RAMCPU board which memorizes this data.
Of course, the optical measuring unit 8 may be changed and applied to a wavelength changing method with a filter.
[0025]So, this optical measuring unit 8 all the reaction vessels 1 from the washing position g of the reaction vessel 1 to the measuring finish position f. For example, it can measure continuously every 20 seconds, the reaction time course of each reaction vessel 1 can be obtained, and these reaction time course data are automatically inputted into the above-mentioned RAMCPU board.
[0026]Control-section CPU has an arithmetic processing circuit which performs the operation and judgment of an operation control circuit and a measurement signal which control operation of this automatic analyzer, and is constituted.

[0027]A RAMCPU board memorizes and saves measurement data, reaction time course data, and trouble data, has a storage capacity more than 1 kilomega byte at least, and is constituted.
A report on examination can be promptly drawn up in real time according to making the above-mentioned measurement data output to an external computer from an external output terminal.

[0028]The washing station 9 is washed in order to present a reuse with the inside of the reaction vessel 1 which optical measurement work ended, and it comprises a publicly known liquid sucking mechanism and a wash water feed mechanism.
[0029]Since the automatic analyzer concerning this example is constituted as mentioned above, As shown in drawing 2, in the reaction vessel 1 which the sampling ended by sampling position a, After the 1st reagent and the 2nd reagent are poured distributively in the reagent distributive-pouring position b, it is agitated in the stirring position c, Next, the 3rd reagent and the 4th reagent are poured distributively in the reagent distributive-pouring position d, and since drive controlling is carried out so that colorimetric measurement may be performed in the optical measurement position f after being agitated in the position e of the following, HDL cholesterol analysis which is four reagent systems can also be conducted automatically, for example.
[0030]In analyzing in this invention using the reagent with which the distributive-pouring time from the 1st reagent to the 4th reagent differs, As accommodate the 1st reagent in the outside of the reagent bottle 10A, and the 3rd reagent is accommodated inside, and the 2nd reagent is accommodated in the outside of the reagent bottle 10B, the 4th reagent is accommodated inside, respectively and it is shown in drawing 3, In the reaction vessel 1 which the sampling ended by sampling position a, After pouring the 1st reagent distributively in the reagent distributive-pouring position b and agitating in the stirring position c, this reaction vessel 1 is transported to the reagent distributive-pouring position d of the following, Pour the 2nd reagent distributively in this position d, and after agitating in the next stirring position e, transport this reaction vessel 1 to the reagent distributive-pouring position b again, and the 3rd reagent is poured distributively, After agitating in the stirring position c, this reaction vessel 1 is transported to the reagent distributive-pouring position d of the following, the 4th reagent is

poured distributively in this position d, and after agitating in the next stirring position e, drive controlling can also be carried out so that colorimetric measurement may be performed in the optical measurement position f.

[0031]If it is in this invention, it is also easy to make a specification change so that the automatic analyzer of a maximum of 24 items of two reagent systems may be performed by allocating only the reagent vessel of one reagent system in a reagent table and measurement of a maximum of 48 items may be performed by one reagent system.

[0032]

[Effect of the Invention]As explained above, it constituted from this invention.

Therefore, the outstanding effect that it can respond also to analysis of the HDL cholesterol analysis etc. which are four reagent systems immediately as well as analysis of one conventional reagent system or analysis of two reagent systems is done so.

[Translation done.]